



Exam information	
Course code and title	ECON2070 Introduction to Strategic Thinking
Semester	Semester 1, 2021
Exam type	Online, non-invigilated, final examination
Exam technology	File upload to Blackboard Assignment
Exam date and time	<p>Refer to your personal exam timetable for the scheduled date and time of this exam. Your examination will begin at the time specified in your personal examination timetable. If commence your examination after this time, the end for your examination does not change. For example, if your examination is schedule for 10am with an end time of 11:40am, even if you commence at 10:30am your end time is still 11:40am.</p> <p>The total time for your examination from the scheduled starting time will be: 2 hours 10 minutes including 10 minutes reading time..</p> <p>A 15-minute submission period is available for submitting your examination. If your examination is submitted after this period late penalties will be applied unless you can demonstrate that there were problems with the system and/or process that were beyond your control.</p>
Exam window	<p>You must commence your exam at the time listed in your personalised timetable.</p> <p>You have from the start date/time to the end date/time listed in which you must complete your exam.</p>
Permitted materials	This is an open book exam – all course materials are permitted.
Recommended materials	Ensure the following materials are available during the exam: Calculator; bilingual dictionary; phone/camera/scanner
Instructions	<p>You will need to download the question paper included within the Blackboard Test.</p> <p>There are a total of five (5) questions in this examination, two (2) in Section A and three (3) in Section B. Answer ALL questions in Sections A and B. Justify all answers and show your work.</p> <p>There is a total of 100 marks. Each question carries the number of marks as indicated. Partial credit may be awarded if a substantial part of the answer or working is provided. You need not explain your notations as long as you are using the notation we developed in class.</p> <p>You need to answer a new question on a new sheet.</p> <p>You may choose to either type your response OR hand write and scan-to-pdf your response.</p> <p>Once you have completed the exam, merge your answers into one (1) PDF file and</p>



	<p>upload the PDF file containing the completed exam answers to the Blackboard assignment submission link.</p>
Who to contact	<p>Given the nature of this examination, responding to student queries and/or relaying corrections to exam content during the exam may not be feasible.</p> <p>At the end of the exam there will be a free text box field. Please use this to specify any assumptions you have made in completing the exam and which questions those assumptions relate to. You may also include queries you may have made with respect to a particular question, should you have been able to 'raise your hand' in an examination room.</p> <p>If you experience any interruptions to your examination, please collect evidence of the interruption (e.g. photographs, screenshots or emails).</p> <p>If you experience any issues during the examination, contact the Library AskUs service for advice as soon as practicable: Chat: support.my.uq.edu.au/app/chat/chat-launcher-lib Phone: +61 7 3506 2615 Email: examsupport@library.uq.edu.au</p> <p>You should also ask for an email documenting the advice provided so you can provide this to the course coordinator immediately at: m.uyanik@uq.edu.au</p>
Important exam condition information	<p>Academic integrity is a core value of the UQ community and as such the highest standards of academic integrity apply to all examinations, whether undertaken in-person or online.</p> <p>This means:</p> <ul style="list-style-type: none">• You are permitted to refer to the allowed resources for this exam, but you cannot cut-and-paste material other than your own work as answers.• You are not permitted to consult any other person – whether directly, online, or through any other means – about any aspect of this examination during the period that it is available.• If it is found that you have given or sought outside assistance with this examination, then that will be deemed to be cheating. <p>If you submit your online exam after the end of your specified reading time, duration, and 15 minutes submission time, the following penalties will be applied to the total mark available for the assessment:</p> <ul style="list-style-type: none">• Less than 5 minutes – 5% penalty• From 5 minutes to less than 15 minutes – 20% penalty• More than 15 minutes – 100% penalty <p>These penalties will be applied to all online exams unless there is sufficient evidence of problems with the system and/or process that were beyond your control.</p>



Undertaking this online exam deems your commitment to UQ's academic integrity pledge as summarised in the following declaration:

"I certify that I have completed this examination in an honest, fair and trustworthy manner, that my submitted answers are entirely my own work, and that I have neither given nor received any unauthorised assistance on this examination".

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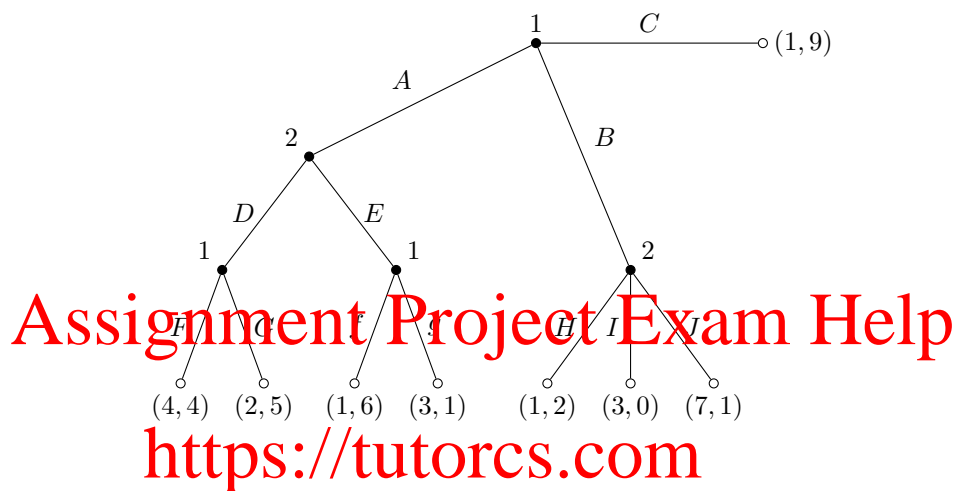
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ECON2070 INTRODUCTION TO STRATEGIC THINKING FINAL EXAMINATION

Section A – Short Questions: Answer all two (2) questions in this section. (Total marks: 30)

Question A1. (15 marks) Find ALL subgame perfect equilibria of the following extensive form game with perfect information. Show your work. [For any payoff pair (x, y) , x is the payoff of player 1 and y is the payoff of player 2.]



Question A2. (15 marks) Consider the following claim: "In every extensive form game with perfect information, every subgame perfect equilibrium is Pareto optimal (efficient)." Is this claim true or false? If it is true, then provide a proof. Otherwise provide a counterexample.

EXAMINATION CONTINUES ON NEXT PAGE

Section B – Problem Solving: Answer all three (3) questions in this section. (Total marks: 70)

Question B1. (25 marks) Alice and Bob work on a joint project. The project can either be difficult or easy, which Bob observes before making his choice. Alice, however, only knows that the project is difficult with 0.5 probability and is easy with 0.5 probability. Alice and Bob simultaneously decide whether to exert high effort or not. The cost of low effort is zero and the cost of high effort is 1 for each player. The utility of each player depends on whether the project is successful or not: if the project is successful, each player gets a benefit of 2 before subtracting his/her cost of effort. If the project is unsuccessful, each player gets zero before subtracting his/her cost of effort. If the project is difficult, the project is successful if and only if both agents exert high effort (in other words, it is unsuccessful if at least one agent exerts low effort). If the project is easy, the project is successful if at least one agent exerts high effort (in other words, it is unsuccessful if and only if both agents exert low effort).

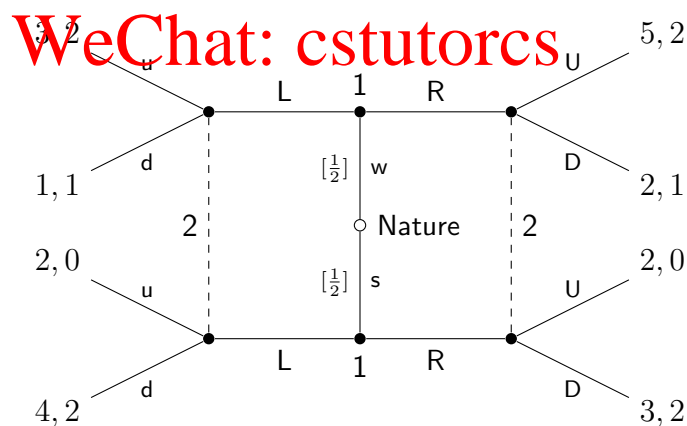
(a) Model this problem as a Bayesian game. In your answer provide the payoff matrices.

(8 marks)

(b) Solve for all Bayesian-Nash equilibria of this game (in pure and mixed strategies).

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Question B2. (20 marks) Find ALL separating perfect Bayesian equilibria of the following extensive form game with imperfect information.



EXAMINATION CONTINUES ON NEXT PAGE

Question B3. (25 marks) Consider the following two-period game. There are two agents. In period 1, the players play the following prisoner's dilemma game:

	C	D
C	4,4	0,5
D	5,0	1,1

In period 2, each player observes the actions chosen in period 1 and play the following battle of the sexes game:

	O	F
O	3,3	0,0
F	0,0	1,1

Each agent's overall payoff is the sum of his/her payoffs from the two periods. Is there a subgame perfect equilibrium of this game such that both players play C in the first period? If yes, identify such an equilibrium strategy, and show that it is indeed an equilibrium strategy. If no, explain your answer.

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Assumptions Question (no marks):

Specify any assumptions you have made in completing the exam and to which questions those assumptions relate. You may also include queries you may have made with respect to a particular question, should you have been able to 'raise your hand' in an examination room.

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END OF EXAMINATION